




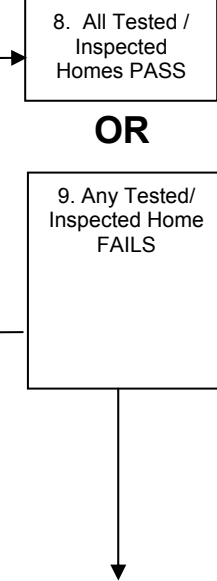
# ENERGY STAR FOR HOMES REVISED SAMPLING PROTOCOL GUIDELINES



This document provides guidance on using the Sampling Protocol to verify ENERGY STAR Homes. These guidelines are effective January 1, 2004. Two sets of guidelines are given: required procedures and best practices. While the required procedures must be followed, the best practices are given to help users successfully implement the Sampling Protocol. Please note that these guidelines do not apply to manufactured homes.

<u>Implementation Steps</u>	<u>Required Procedures</u>	<u>Best Practice</u>
<div>1. HERS Rater/Provider Qualification</div> 	<p>a) Once RESNET initiates accreditation for HERS rater/provider sampling, this accreditation must be secured. This accreditation can be received by submitting either of the following application forms to RESNET (<a href="http://www.natresnet.org">www.natresnet.org</a>):</p> <ul style="list-style-type: none"> <li>- <b>'Experience' form</b> documenting at least 100 homes individually qualified as ENERGY STAR that can be checked on EPA's data base; or</li> <li>- <b>'Alternate Experience' form</b> documenting experience other than verifying 100 ENERGY STAR qualified homes (e.g., research work, provider field technician).</li> </ul>	<ul style="list-style-type: none"> <li>■ HERS rater/provider should also be qualified to train subcontractors on energy efficiency improvements (e.g., duct sealing, air sealing, insulation installation).</li> </ul>
<div>2. Builder Qualification</div> 	<p>a) Builder signs <b>Partnership Agreement</b> to become an ENERGY STAR Partner.</p> <p>b) To be eligible for sampling, the builder must either:</p> <ul style="list-style-type: none"> <li>- build a min. of 85 homes per year; or</li> <li>- build subdivisions and apply sampling protocol to same floor plan with same sub-contractors.</li> </ul>	<ul style="list-style-type: none"> <li>■ Builder has established procedures for training subcontractors and incorporating in-house quality control techniques.</li> </ul>
<div>3. Select the initial batch of homes and energy efficient measures needed to meet ENERGY STAR.</div> 	<p>a) Builder selects an initial batch of homes and contacts a 3<sup>rd</sup> party verifier qualified to do sampling (see ENERGY STAR Partner Locator Tool on <a href="http://www.energystar.gov/homes">www.energystar.gov/homes</a>.)</p> <p>b) 3<sup>rd</sup> party verifier identifies energy efficient measures (options) needed to meet or exceed ENERGY STAR based on:</p> <ul style="list-style-type: none"> <li>• HERS rating of individual plans for each model of homes in batch, <b>or</b></li> <li>• EPA-approved Builder Options Packages (BOPs).</li> </ul> <p>c) If custom HERS analyses are used to select energy measures, plan reviews must be based on a worst case configuration (e.g., worst orientation, all options that increase window area, and consider options like extended family rooms, sunrooms, etc.)</p> <p>d) Builder selects energy efficient measures based on 3<sup>rd</sup> party verifier recommendations.</p>	<ul style="list-style-type: none"> <li>■ 3<sup>rd</sup> party verifier performs diagnostics on an existing model home to get a baseline for current air infiltration and duct leakage. This enables the 3<sup>rd</sup> party to identify the improvement needed in these areas.</li> <li>■ Builder should select one set of energy efficient measures for all plans if possible.</li> </ul>

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<div style="border: 1px solid black; padding: 5px; text-align: center;">4. Builder builds first home</div> <div style="text-align: center;">↓</div>	<p>a) This is the first of at least three consecutive homes that must be fully tested and inspected to demonstrate readiness for consistently complying with ENERGY STAR guidelines before the sampling protocol can be initiated.</p>	<ul style="list-style-type: none"> <li>▪ 3<sup>rd</sup> party verifier works with the builder and their sub-contractors, especially focused on air sealing and duct sealing, to identify any changes required and providing training on the verification/inspection process.</li> <li>▪ This training should also be repeated for new crews and on a periodic (e.g., annual) basis.</li> </ul>
<div style="border: 1px solid black; padding: 5px; text-align: center;">5. Initial Testing</div> <div style="text-align: center;">↓</div>	<p>a) 3<sup>rd</sup> party verifier performs full testing and inspections until it is determined that the builder and subcontractors are ready to use sampling verification with minimum risk of failures.</p> <p>b) This initial testing must include at least 3 consecutive houses successfully meeting ENERGY STAR guidelines, or until the 3<sup>rd</sup> party verifier is satisfied the builder can consistently meet all ENERGY STAR requirements.</p> <p>c) Repeat Initial Testing for each new subdivision where there is a change in subcontractors.</p>	<ul style="list-style-type: none"> <li>▪ 3<sup>rd</sup> party verifier should select different models for initial testing.</li> <li>▪ For less experienced builders, 3<sup>rd</sup> party verifiers using the sampling protocol have found it necessary to test five or more consecutive homes to ensure a minimum risk of failure.</li> <li>▪ Repeat Initial Testing step for all new subdivisions, especially if there is a change in architectural design.</li> </ul>
<div style="border: 1px solid black; padding: 5px; text-align: center;">6. Selecting Batches</div> <div style="text-align: center;">↓</div>	<p>a) Builder identifies a “Batch” which is a group of homes ready for diagnostics (i.e., drywall complete, interior door jams installed, HVAC system installed, and final air sealing completed) within a reasonable block of time (e.g., month). As a result, the construction period for homes in a batch typically overlap. The 3<sup>rd</sup> party verifier must be able to choose any address from the batch for diagnostics randomly and without preference or bias.</p>	<ul style="list-style-type: none"> <li>▪ Keep the batch size small (e.g., 7 homes) and time frames short (e.g., 30 days) to avoid any failures that may occur from being widespread, and to enable the builder to quickly correct any systemic problems that may be found.</li> </ul>
<div style="border: 1px solid black; padding: 5px; text-align: center;">7. Testing / Inspecting of <math>\geq 15\%</math> of homes in batch</div> <div style="text-align: center;">↓</div>	<p>a) 3<sup>rd</sup> party verifier confirms that readiness to meet ENERGY STAR during initial testing is still in force.</p> <p>b) <b>3<sup>rd</sup> party verifier randomly selects</b> at least 15% of homes from a batch for testing and inspecting. If builder builds less than 85 homes, batch must be from the same subdivision and the same model.</p> <p>c) Depending on the verification method, testing and inspecting includes performing a full HERS rating or BOP inspection.</p>	<ul style="list-style-type: none"> <li>▪ When selecting the homes from an available batch for testing and inspecting, the 3<sup>rd</sup> party verifier should select different models to ensure an effective sample.</li> </ul>

<u>Implementation Steps</u>	<u>Required Procedures</u>	<u>Best Practice</u>
<div> <div>8. All Tested / Inspected Homes PASS</div> <div>OR</div> <div>9. Any Tested/ Inspected Home FAILS</div>  </div>	<p>a) <b><i>If each tested home within the batch PASSES (all measures meet or exceed specified levels from Step 3),</i></b> then all homes in the batch PASS and ENERGY STAR labels can be affixed to all homes in the batch.</p> <p>a) <b><i>If any rated home within the identified batch FAILS (any measure does not meet specified level from Step 3),</i></b> the builder will be directed to fix the cause(s) of failure, and 30% of the remaining homes in the batch will be randomly selected for inspection and testing regarding the specific cause(s) of failure (e.g., excessive duct leakage, window not to specification, improper insulation installation, etc.).</p> <p>b) <b><i>If any failures occur in the additional tested homes,</i></b> the builder will be directed to fix all homes in the batch; to undertake a root cause analysis to find the source of problem causing the failure; and to fix the construction processes and/or building components causing the problem. All remaining homes in the batch must be individually inspected and tested for ENERGY STAR compliance.</p> <p>c) <b><i>A builder subdivision with 3 failures within a 6-month period</i></b> is no longer eligible to use the sampling protocol in that community until successfully repeating “Initial Testing” (Step 5). Sampling can be reinstated after at least 3 consecutive homes are individually verified to comply with ENERGY STAR and the 3<sup>rd</sup> party verifier is satisfied the builder is ready to consistently comply with ENERGY STAR guidelines at that community using the sampling protocol.</p>	<ul style="list-style-type: none"> <li>3<sup>rd</sup> party verifier should address any minor problems that may have been found during testing/inspecting by facilitating root-cause analysis and remediation with the builder and/or subcontractors.</li> <li>After a failure has been found, the sampling rate should be increased until the builder demonstrates readiness to resume minimum sampling rate.</li> </ul>
<div>10. 3<sup>rd</sup> Party Verifier Reports Labeled Homes to EPA.</div>	<p>a) No home in a batch may be labeled ENERGY STAR until the sampling protocol is successfully completed for that batch.</p> <p>b) 3<sup>rd</sup> party verifier will keep a record of every home in the batch, both tested and not, and of any failures and their resolution.</p> <p>c) 3<sup>rd</sup> party verifier will ensure that provider reports to EPA on a quarterly basis the full number of homes verified as ENERGY STAR including homes that were not tested and inspected.</p>	<ul style="list-style-type: none"> <li>Before sampling begins, the 3<sup>rd</sup> party verifier works out details with builder for providing ENERGY STAR labels on both field verified homes and homes verified as part of the sample.</li> </ul>